

## Mercury in seawater along the west coast of India

P Kaladharan\*, V K Pillai, A Nandakumar & P K Krishnakumar<sup>†</sup>  
Central Marine Fisheries Research Institute, Cochin-682 014, India

Received 20 March 1998, revised 17 May 1999

The distribution of mercury showed a conspicuous pattern showing low levels ranging up to 0.058  $\mu\text{g/l}$  during premonsoon and monsoon seasons and an increase of 100% during the postmonsoon season. The higher levels of mercury, although observed stray during the southwest monsoon as well as postmonsoon period from Veraval coast and from the Wadge Bank, stress the need for close monitoring.

Mercury is regarded as a trace element of concern in marine pollution studies due to its high toxicity. Mercury has been reported to occur at elevated levels in certain 'hot spots' along the Indian coast<sup>1-5</sup> which are linked to the discharge of effluents, geothermal currents etc. Free or inorganic mercury is relatively lesser toxic than organic mercury. However, these free or inorganic mercury levels pose potential danger to marine biota as they can transform into organo-mercury with aldehydes<sup>6</sup>. The Hg data presented here include the levels of total mercury (particulate and dissolved) from the surface waters of Arabian Sea during the premonsoon, southwest monsoon and postmonsoon period of 1996. This is the first report to include seasonal fluctuations and could also be significant to review the situation in this area, a decade after earlier studies made by Sanzgiry *et al.*<sup>3</sup>

Replicate water samples from the surface (1-5 m) were collected onboard *FORV Sagar Sampada* during the year 1996 (Cruise Nos. 140, 144, 146, 148 and 149) along the west coast of India from stations fixed at every one degree square. Water samples (one litre) were acidified onboard with 1.0 ml of conc.  $\text{HNO}_3$ . The pH of water samples after acidification ranged from 1.98 to 2.04 and the samples were stored at low temperatures. The Hg levels were determined in the shore laboratory by ECIL Mercury analyser (model MA 5800 E) after a preconcentration step<sup>7</sup>. The detection limit was 0.1  $\mu\text{g/l}$  and recoveries of 84-90% Hg were observed from the spiked standards ( $\text{HgCl}_2$ ) employing this method.

The present study indicated that the distribution of Hg in the Arabian Sea had a conspicuous pattern showing very low values ranging from below detection levels (BDL) to 0.058  $\mu\text{g/l}$  during the premonsoon period (Fig. 1) and remained more or less same during the S.W. monsoon period with an exceptional higher value of 0.117  $\mu\text{g/l}$  Hg observed in the shelf waters off

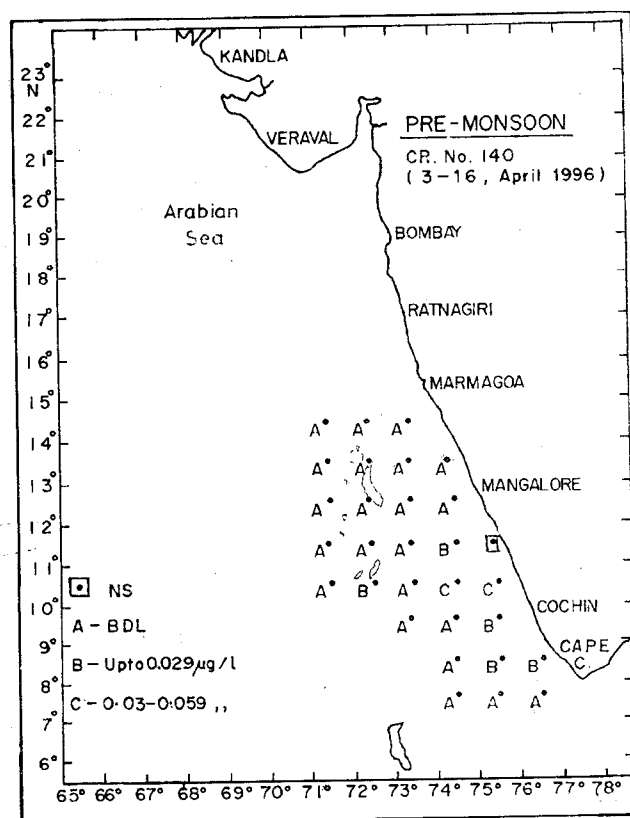


Fig. 1—Distribution of total Hg ( $\mu\text{g/l}$ ) in one degree square along the Arabian Sea during premonsoon

\*For correspondence

<sup>†</sup>Present Address: Mangalore Research Centre of C M F R I, Bolar, Mangalore 575 001, Karnataka, India

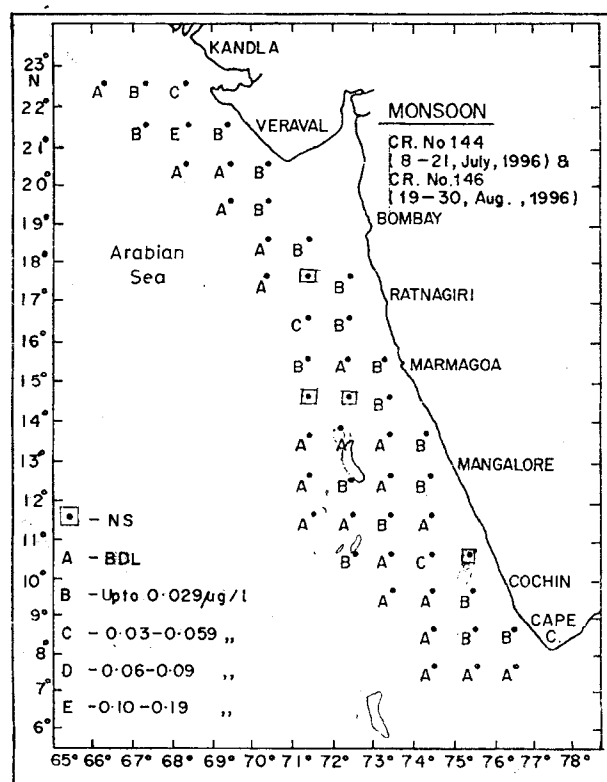


Fig. 2—Distribution of total Hg ( $\mu\text{g/l}$ ) in one degree square along the Arabian Sea during southwest monsoon

Veraval (Fig. 2). While during the postmonsoon season the Hg levels attained higher than the levels during the earlier seasons, ranging from BDL to  $0.117 \mu\text{g/l}$  with some pockets showing stray high values (Fig. 3).

Stray occurrence of higher levels of Hg was observed both in the southern and northern latitudes during the postmonsoon period of 1996 (Fig. 3) ranging from  $0.117 \mu\text{g/l}$  in the south, adjacent to Cape and Laccadive Sea to a concentration of  $0.352 \mu\text{g/l}$  in the north adjoining the Veraval coast, where a similar higher trend prevailed during the S.W. Monsoon season also (Figs 2,3). The seasonal average of Hg levels showed a 100% increase during the postmonsoon period over the preceding monsoon as well as premonsoon seasons, although the sampling coverage during the premonsoon season could be limited only to the southwest coast. Earlier studies indicate higher levels of Hg distributed in the surface than in the sub-surface<sup>5,6</sup>. Hence the present study was limited to surface only.

The Hg levels observed during the present study was generally well within the tolerance limit for sea<sup>8</sup> and

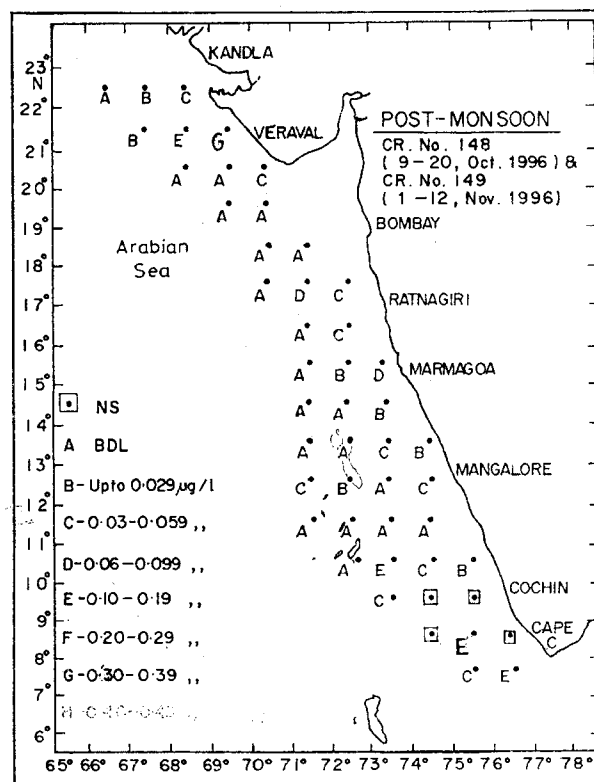


Fig. 3—Distribution of total Hg ( $\mu\text{g/l}$ ) in one degree square along the Arabian Sea during postmonsoon

well below the average levels for Arabian Sea<sup>3</sup>. However, the maximum values of Hg observed during the postmonsoon season from Veraval coast which is known for the shrimp and Bombayduck fishery and from the vicinity of Wadge Bank (adjacent to Cape) which is known for the abundance of perches and cephalopod resources warrants the need for close monitoring and evaluation on the levels of living resources from these areas.

The authors thank Dr M Devaraj, the Director and Dr V N Pillai, the Head, FEM Division for their encouragements and to the Captain and the Crew, *FORV Sagar Sampada* for the cooperation received.

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